

*This chapter is dedicated with all
my love to my grandmother,
Carmela Picone. Thank you for
your strength, your kindness and
your love.*



Chapter 15

Female Fitness

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According to the Centers for Disease Control and Prevention (CDC), more than 60% of American women don't engage in the recommended amount of physical activity. Further, the CDC states that more than 25% of American women aren't active at all and that physical inactivity is more common among women than men. Physical inactivity – or a sedentary lifestyle – is a risk factor for many diseases including coronary heart disease. Being even moderately active reduces the rate of disease and death and improves not only the quantity but also the quality of life. Regular exercise combined with a healthy-lifestyle approach can help all women improve their health and well-being and get fit.

THE BENEFITS OF PHYSICAL ACTIVITY

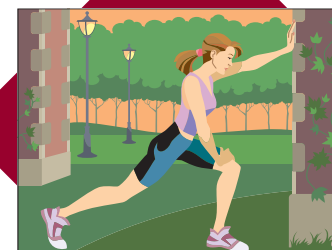
Previously, it was thought that a strenuous level of exercise was necessary in order to achieve the many benefits of physical activity. Research has led to changing attitudes, however. In 1995, the American College of Sports Medicine (ACSM) and the CDC issued new guidelines stating that every adult should accumulate 30 minutes or more of moderately intense physical activity on most, and preferably all, days of the week. Moderate physical activity equates to brisk

walking (at a pace of about 3-4 mile per hour) or anything that expends a similar amount of calories. This baseline of 30 minutes of “activity” includes any type of physical exertion such as yard work, cleaning or walking and can be done continuously or split up into bouts of 10-15 minutes of activity over the course of a day. Even though this level of activity doesn't necessarily involve a typical structured exercise plan, the resulting “health-related” benefits are substantial and include a decreased risk of chronic disease as well as improved quality of life. The goal for women of all ages should be to strive for this minimum amount of activity everyday.

Programs of lower level intensity that are designed to improve your “health” may not significantly improve your “fitness”; higher levels of intensity are needed to develop and improve physical fitness (which is the ability to perform physical activity). The CDC states that women who maintain a regular routine of physical activity that's of longer duration or greater intensity are likely to derive greater benefit. This would include a structured exercise program that's comprised of flexibility, aerobic and strength training.

Flexibility Training

An active lifestyle and a general stretching routine that includes all of the major muscle groups promote overall flexibility. A





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sedentary lifestyle and lack of flexibility are associated with an increased risk for injury, chronic low-back pain and a decrease in mobility associated with aging (which can lead to a loss of independent living). Conversely, increasing and maintaining flexibility can help to prevent injury, reduce low-back pain and maintain joint mobility. Increasing and maintaining flexibility also improves posture, decreases muscular tension and stress and may enhance athletic performance.

Flexibility exercises are of special importance to women because stretching often relieves muscular cramps, backache and general fatigue that are associated with dysmenorrhea (painful menstruation). Current guidelines suggest slowly stretching a muscle to the point of tension and then holding that position for about 10-30 seconds while breathing and concentrating on posture. Stretching exercises should be performed at least 2-3 days per week, preferably on a daily basis.

Aerobic Training

Aerobic (or cardiorespiratory) training includes activities such as cycling, jogging and stairclimbing and sports such as soccer, basketball and swimming. These activities condition your heart and lungs leading to better overall health.

Specific benefits of aerobic fitness are a stronger heart muscle; lower resting heart rate, blood pressure and cholesterol levels (which, in turn, lower the risk of heart attack and stroke); quicker recovery following strenuous activities and reduced risk for hypokinetic diseases such as diabetes (diseases associated with physical inactivity and sedentary lifestyles). Aerobic training also reduces stress and depression, prevents obesity, aids in weight management and improves self-image. Exercise during menopause has a protective effect against heart disease, abdominal weight gain and osteoporosis and may result in fewer symptoms such as sleep disturbances. Current guidelines suggest participating in aerobic training 3-5 times a week for 30-60 minutes.

Strength Training

Another vital component of a total physical fitness program is strength training. The importance of strength training for females cannot be overstated. Strength training can include any number of resistance-training exercises such as selectorized and plate-loaded machines, free weights (barbells and dumbbells), weighted balls/bars, resistance bands and bodyweight exercises such as push-ups.

Strength training stresses your bones and improves and maintains bone density. This

decreases your risk of osteoporosis later in life and may delay the age at which bone fractures occur. Bone fractures often happen as a result of falling. Strength training may also improve balance and help prevent falls from occurring in the first place.

Another major benefit of adding strength training to a fitness program is the effect that it has on resting metabolism. As your muscle mass increases, your body uses more calories, even at rest. This has a positive influence on your body composition; the percentage of body fat decreases, resulting in a loss of “inches” and a more defined appearance. Therefore, building and preserving lean-body mass is a key component of any weight management program.

Muscular strength and endurance are also necessary for the functioning of daily life. Carrying grocery bags, for example, is an activity of daily living that becomes more difficult with age. Strength training prevents the decrease of muscle mass that’s associated with aging and helps maintain independent living. Current guidelines suggest that strength training should be done 2-3 times a week on non-consecutive days.

STRENGTH TRAINING AND THE MYTH OF MASCULINITY

Many women fear that strength training will lead to significant muscle hypertrophy (an increase in the size of a muscle) and cause an

unwanted “masculine” appearance. Based on these concerns, strength training – which is favorable for building strength and bone mass – is often completely omitted from fitness programs. The myth that women experience the same amount of “bulking up” as men has persisted but has no basis.

On average, men and women do exhibit many physiological differences. Men are taller, heavier and less fat and have a greater aerobic capacity due, in part, to a larger heart size and higher hemoglobin levels. Also, men have wider shoulders, greater bone width (except for hip width) and more muscle mass. Women, on the other hand, are designed for the role of child-bearer and, as such, have less muscle mass and greater stores of body fat to be used as energy.

Although men and women respond to strength training in a similar way, men are stronger because they have more muscle mass. Men also have a greater capacity for muscle hypertrophy. These differences are largely a result of the sex-specific hormones, collectively called “androgens” (the male sex hormones which include testosterone), as well as estrogens and progesterones (the female sex hormones).

Women do have small amounts of testosterone and adapt to training with muscular growth. But because they lack higher amounts of testosterone, their ability for muscular growth remains quite limited



Make a commitment to your exercise program and do it on a regular basis (at least three times each week).



and is small in comparison to men. Women can, however, significantly increase their muscular strength without demonstrating a significant increase in muscular size. Instead, strength gains are attributed primarily to neuromuscular changes. Of course, some women who are physically active will have more developed muscles than others. Variations in muscular appearance can be attributed primarily to genetic differences. Body composition also affects the appearance of musculature; a lower percentage of subcutaneous body fat (the fat that lies directly under the skin) makes muscles more visible and defined.

Women who are portrayed in physique magazines and some female athletes who compete at the national and international levels help to promote the myth of masculinity. However, this doesn't mean that participating in a strength-training program will result in a similar appearance. It can be expected that a competitive athlete who trains for several hours each day will have more muscle mass than a woman who lifts weights twice a week primarily for fitness benefits. Many competitive athletes also have levels of body fat that are extremely low and sometimes unhealthy, affecting their appearance. And unfortunately, numerous athletes who compete at high levels of sport often succumb to the pressures of using illegal muscle-enhancing drugs such as

anabolic-androgenic steroids (synthetic derivatives of testosterone). As the name suggests, steroids produce anabolic (or growth-promoting) effects and androgenic (or masculinizing) effects. The latter effects include the development of secondary sex characteristics such as a deepened voice and facial hair. If an athlete is training with adequate resistance, these drugs can lead to heavy musculature but they also can have serious and sometimes irreversible health consequences.

EXERCISE AND PREGNANCY

At one time, exercise during pregnancy was seen as detrimental. It was feared that excessive movement could harm the baby, that exercise could take blood and, therefore, oxygen away from the fetus and that exercise could possibly induce early contractions. Current research, however, has shown that it's safe to exercise during pregnancy. In fact, keeping fit during pregnancy is now recommended by most medical authorities and has become an accepted part of good prenatal care.

Benefits of Exercise

The benefits of exercise for a pregnant woman are extensive and go beyond just staying fit. A properly designed fitness

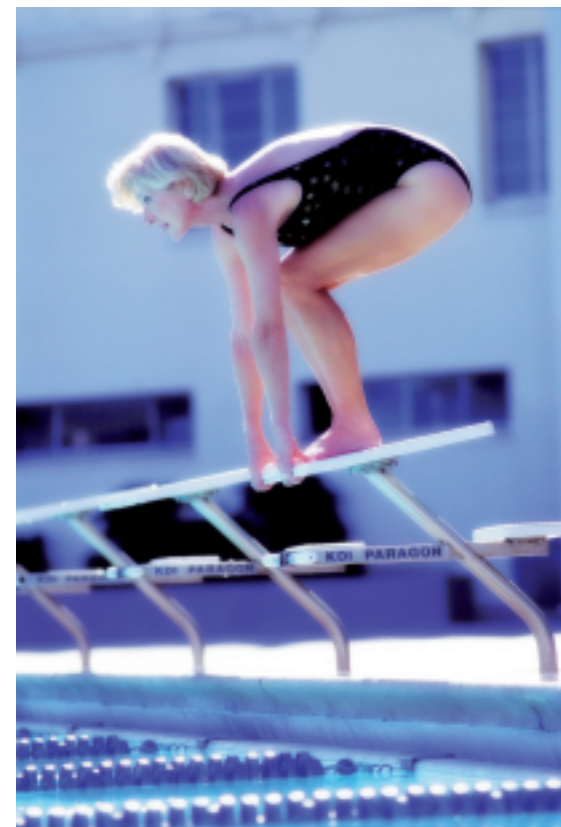
program can lead to a healthy pregnancy, an easier labor and a quicker recovery. During pregnancy, physiologic changes can cause a great deal of muscular discomfort such as back, neck and shoulder aches. As a woman gains weight, her center of gravity shifts forward and puts strain on her lower back. Exercise can help to prevent and relieve the basic discomforts of pregnancy and improve posture. Fluctuations in the hormones estrogen and progesterone bring about unpleasant changes in the stomach and digestive system. It has been shown that exercise reduces nausea, improves digestion and reduces constipation. The recommended amount of weight gain during pregnancy is approximately 25-35 pounds, depending on the weight of the woman before she became pregnant. Many women, however, exceed their recommended caloric intake and gain an unreasonable amount of weight. Women who gain more weight than recommended during pregnancy and fail to lose this weight six months after giving birth have a much higher risk of being obese later in life. The calories that are used during exercise can help prevent an excessive weight gain.

Exercise during pregnancy results in improved aerobic and muscular fitness as well as better endurance and circulation. Improvements in circulation help to decrease the risk of varicose veins, hemorrhoids and fluid retention and improve the

transportation of oxygen and nutrients to the fetus. Exercise helps to lower and control the levels of blood sugar in those who experience gestational diabetes mellitus. Pelvic-floor muscle exercises may reduce the risk of urinary incontinence during and following pregnancy. And improved balance, maintenance of bone mass, better sleep, less fatigue and reduced anxiety and stress are also added benefits to a woman who includes exercise as part of her prenatal routine.

During labor and delivery, a fit woman will have more endurance and strength to cope with the long hours of strenuous labor. According to the ACSM, a shorter active phase of labor, less pain and fewer obstetric interventions are needed in those who keep fit while pregnant.

The benefits of exercise are also seen postpartum. Those who keep active during their pregnancies have a quicker recovery from labor and a more rapid return to pre-pregnancy flexibility, strength and weight. Improving and maintaining muscular strength can help a new mother lift, carry and care for her growing infant. And exercise in the postpartum period can help a new mother regain the strength of her abdominal and pelvic floor muscles while warding off postpartum depression.



The benefits of exercise include weight management, stress reduction, lower blood pressure and cholesterol levels and improved self-image.



A properly designed fitness program can lead to a healthy pregnancy, an easier labor and a quicker recovery.

Fitness Prescription

The current guidelines of the American College of Obstetricians and Gynecologists (ACOG) recommend that pregnant women engage in 30 minutes or more of moderate exercise on most, if not all, days of the week. Pregnant women should choose enjoyable activities that pose a low risk of falling such as walking and stationary biking. Group exercise classes, yoga and water activities, especially those designed for pregnant women, are also suitable choices.

Exercise intensity can be monitored using Borg's Rate of Perceived Exertion (RPE) and the "Talk Test." Based on a scale that ranges from six to 20, pregnant women are recommended to stay in the range of 12-14 (described as "somewhat hard"). And if you can't carry on a conversation, you should slow your pace. Exercise intensity should be modified according to maternal symptoms. Throughout pregnancy, it's normal to change some activities or decrease the intensity of workouts.

A woman who has been previously exercising and becomes pregnant can continue to do so without major modifications (after checking with your physician first). And while it's best for a woman to get fit before she becomes pregnant, it's never too late to start an exercise program. Women who have been

sedentary should first consult with their physician and then begin exercising at low intensities performing non- to low-impact activities such as walking. Any woman with a high-risk pregnancy may need to modify or possibly eliminate exercise.

Here are some additional guidelines for exercise during pregnancy:

- **Make a commitment to your exercise program and do it on a regular basis (at least three times each week).**
- **Include pelvic-floor muscle exercises in your routine.**
- **Refrain from holding your breath during exertion.**
- **Emphasize good posture.**
- **Avoid exercising flat on your back after the first trimester. This can restrict circulation.**
- **Continue to perform stretching exercises but do so gently since relaxin, a hormone that's produced during pregnancy, causes ligaments to soften and stretch.**
- **Dress comfortably. Wear a supportive maternity bra and supportive athletic shoes. Use layers of breathable clothing to help you remain cool.**
- **Warm up with about five to ten minutes of light activity; cool down with about five to ten minutes of light activity and stretching.**

- **Avoid exercise that may cause a loss of balance, especially in the third trimester.**
 - **Refrain from activities that put you at high risk for injury or involve the potential for abdominal trauma (such as ice hockey, kickboxing, soccer, in-line skating, skiing and horseback riding). Avoid all contact sports, high-altitude exertion (above 6,000 feet) and scuba diving.**
 - **Get adequate calories. Pregnancy for a healthy adult of an appropriate bodyweight requires an additional 300 calories per day and breast-feeding requires an additional 500 calories per day. Those who exercise regularly during this period may require additional calories.**
 - **Eat before exercising in order to prevent hypoglycemia (low blood sugar).**
 - **Prevent dehydration and hyperthermia (overheating) by drinking adequate fluids before, during and after exercise.**
 - **Exercise in cooler conditions and avoid exerting yourself in hot, humid weather. Keep your body cool, especially during the first trimester, by ensuring adequate hydration, wearing appropriate clothing and having optimal environmental surroundings during exercise. The reason is that increased body temperature is associated with birth defects and also**
- redirects blood away from the uterus to the skin.**
- **Pay attention to unusual signs and symptoms of discomfort. Stop exercising and seek immediate medical attention if any of the following occur: cramping, bleeding, leaking of amniotic fluid, contractions, faintness, palpitations or rapid heartbeat, chest or back pain, severe breathlessness, numbness in any part of the body, calf pain or swelling or a decrease of fetal activity.**
 - **Remember that many of the changes of pregnancy continue four to six weeks postpartum. Check with your physician as your body recovers. Continue your program but take it slowly and carefully. Begin with slow walking, pelvic-floor muscle, abdominal and low-back exercises and stretching. Resume your pre-pregnancy exercise routine gradually based on your physical capability.**
- THE FEMALE ATHLETE TRIAD**
- Whether you're a novice exerciser or a veteran, you may not have heard of the term "female athlete triad." This relatively new disorder has only been discussed within the athletic and sports medicine communities since the 1990s. The triad – which relates to

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physically active girls and women – was acknowledged and defined in 1992 as members of the Women's Task Force of the ACSM revealed that female athletes were being afflicted with a combination of problems that resulted in harmful consequences.

This new “syndrome” is really a set of symptoms that produces damaging physical and psychological consequences. The female athlete triad is comprised of three linked medical conditions that occur in sequence: disordered eating, menstrual irregularities and premature osteoporosis. This is a major concern because the first two decades of life are absolutely critical for bone development. Anything that disrupts bone growth in young females who haven't yet achieved a peak in bone density can be devastating. Adolescents and young adults must maximize bone density early in life for optimal skeletal health.

Athletes at Risk

At the underlying core of the triad appear to be both external and internal pressures that cause a female to have a heightened focus on thinness. Expectations to fit a specific body image can come from parents, coaches, judges, sports agents or teammates. Our Western culture, which emphasizes thinness, only exacerbates the dilemma. Although endurance athletes, gymnasts and dancers

seem to be more at risk, the triad has now been recognized across all sports and fitness levels including physically active girls and women who aren't competing. Pre-adolescent and adolescent girls as well as young adults face an increased risk because of puberty and the insecurities about body image that it can bring. Also, the pressure to excel often drives these competitive and dedicated athletes. Perfectionism and self-critical behavior combined with low self esteem and depression may set the stage for grappling with the female athlete triad. Although the disorder can be found across all levels of athletics, those who feel external and internal pressures to achieve or maintain a certain physique are at the highest risk.

Components of the Triad

As noted earlier, the female athlete triad is comprised of disordered eating, menstrual irregularities and premature osteoporosis. Let's look at each of these in greater detail.

Disordered Eating

Various biological, psychological and sociocultural factors may predispose an individual to develop an eating disorder. Major risk factors include one or more of the following: female gender; perfectionist personality traits and a high need for control; poor self esteem; a sense of loneliness;

external and internal pressures to succeed; external and internal pressures to attain an ideal bodyweight and/or optimal body fat; genetic predisposition (such as family history of obesity, eating disorders, substance abuse and depression); dieting; and a personal history of physical or sexual abuse, teasing and harassment. According to the National Association of Anorexia Nervosa and Associated Disorders, the onset of illness occurs by age 20 in 86% of the cases. At the time of puberty, an adolescent struggles with a changing body, body-image preoccupation and peer pressure. Many young girls who “survive” their adolescent years without an eating disorder may have greater risk during their early collegiate years when the pressure to succeed academically, athletically and socially intensifies.

A wide spectrum of conditions has been noted on the continuum of disordered eating. At one end are problems that carry a lower risk such as poor nutrition and improper or “fad” dieting; at the other end are devastating, clinically defined, chronic illnesses. Early phases of an eating disorder, or “pre-conditions”, often precede a full-blown illness, and behaviors of a disorder may also intensify over time.

Anorexics refuse to maintain a minimally normal bodyweight and have an intense and irrational fear of gaining weight or becoming fat. They’re often quite thin and visibly

underweight yet continue to lose weight. Although an obsession with food and weight exists, characteristic behaviors are a denial of hunger and refusal to eat. Anorexics have distress about their body image/weight and shape and often deny the seriousness of their current low bodyweight. In girls who have been menstruating normally, the absence of at least three consecutive menstrual cycles is part of the diagnostic criteria. Extreme weight loss causes medical risks such as anemia, amenorrhea, dehydration, electrolyte imbalance, decreased body temperature and damage to major organs. Death may result from starvation, electrolyte imbalances (cardiac arrest) or suicide.

In bulimia, patients become caught in a binge-and-purge cycle. During recurrent episodes of uncontrollable, secretive and rapid binge eating, a bulimic consumes large quantities of food, typically high-calorie “junk food,” in a limited amount of time (usually less than two hours). After overeating, a bulimic is frequently consumed by feelings of anxiety, guilt and depression. In order to prevent weight gain, the individual subsequently engages in unhealthy behaviors such as self-induced vomiting, laxatives or diuretics, starvation (fasting) or compulsive exercising. In contrast to anorexics, those with bulimia are often at a normal though fluctuating

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bodyweight and, therefore, are harder to recognize. As with anorexics, bulimics also have a fear of gaining weight and critically judge themselves by how they feel about their bodyweights and shapes and often harshly compare themselves to others.

Menstrual Irregularities

Amenorrhea – the cessation of menstruation – was once thought to be a sign of fitness but the dangers and negative consequences of menstrual irregularities have now become apparent. In the second part of the female athlete triad, changes in the menstrual cycle are due to an eating disorder or energy imbalance (when caloric expenditure exceeds caloric consumption). As a result of disordered eating or inadequate nutrition, the hypothalamus, which regulates the endocrine gland, affects menses and the production of estrogen. The lack of protective estrogen, in turn, leads to weakened bones and significantly increases the prevalence of osteoporosis, a condition that's usually only thought of as a disease of the elderly.

Premature Osteoporosis

The third component of the triad – premature osteoporosis – is a dangerous bone disease that's characterized by low bone mass. Research has shown that, in some cases, active young athletes and dancers with amenorrhea have skeletons similar to 50- or

even 70-year-old women. The subsequent effects of amenorrhea are premature osteoporosis and increased risk for stress fractures and broken bones. As an example, the risk for stress fractures in amenorrheic female runners is 4-5 times higher when compared to eumenorrheic (normally menstruating) females. Bone mass (or bone density) continues to increase throughout the years of growth and development. A peak in bone mass, called the “peak bone mineral density” (PBMD), is reached at a young adult age. Total-body bone mineral density reaches adult values by approximately 18 years of age with the most rapid period of bone gain occurring between the ages of 10 and 14. Females reach PBMD around their mid-to-late 20s. In addition to genetics and the rate of bone loss later in life, the risk of fracture depends on the peak bone mass that's achieved by about age 20. It may be possible to delay the risk of fracture by maximizing bone mass as a young adult. Influencing bone mass during the first two decades of life in order to achieve a higher PBMD depends, in part, on preventing the female athlete triad in young athletes. Since the best defense against osteoporosis is to build as much bone as possible during the bone building years, the target population for prevention ought to be the younger generations.

REDUCING THE RISK OF OSTEOPOROSIS

Osteoporosis, a disease of thinning bones, afflicts millions of Americans. It's a major public health problem with high economic and personal costs. Obviously, the number of Americans who are affected by the disease will increase unless prevention and treatment strategies are seriously investigated and implemented at this time.

Women are four times more likely than men to sustain osteoporosis-related fractures. Females start out with less bone and muscle mass, can be affected by menstrual irregularities throughout their lives and are vulnerable to diets that may be deficient in calcium. At the stage of life known as "menopause," women also lose a great deal of bone mass due to a gradual decrease in the natural production of estrogen. This hormone acts to protect women against osteoporosis by slowing the loss of calcium from bone. In menopausal women, therefore, a loss of estrogen translates into a decrease in bone formation or a loss of bone. Low bone mass, called "osteopenia", is the first phase of the disease. From this point, bones may become increasingly porous, brittle and fragile and women are placed at high risk for fracture from even the slightest day-to-day activities.

The current projection is that one in two women will sustain an osteoporotic fracture

during her life. Fractures (which commonly occur at the hip, spine and wrist) are frequently the first symptom or indication to many that this silent but damaging and often dangerous condition is present. Fractures are quite critical and may prove fatal with one out of five women dying as a result of hip-fracture complications. Of course, menopause is a normal physiological consequence of aging and women can expect to live out half of their adult lives in this condition. By the age of 52, for instance, 85% of women will have reached menopause. During the first five to seven years of menopause, women have an accelerated bone loss of one to two percent or more per year; in fact, bone loss can total about 15% for the average woman during the first five years. Throughout the remaining postmenopausal years, bone loss continues but the rate slows and levels off at approximately one percent per year. All women will inevitably be faced with menopause, the increased risk of osteoporosis, and decisions about prevention and treatment of the disease during their lives.

Exercise and Bone Health

Regular physical activity may be one method to promote and maintain bone mineral density and delay bone fractures from

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occurring. Weight-bearing exercise has been shown to have a positive effect on bone density by mechanically loading the skeleton. Progressive strength training has recently been recommended as part of an overall exercise program to improve and maintain bone mineral density. Weight-bearing exercise appears to be a key element throughout a woman's life for the prevention of osteoporosis. In younger women, weight bearing aerobic exercise, such as tennis or jogging combined with strength training, can improve the development of peak bone mass prior to menopause. In the postmenopausal population, even osteopenic women can help preserve bone mass with a regular program of moderate- to high-intensity weight bearing exercise.

Postmenopausal women experience many additional benefits from strength training. With increasing age, muscle mass and strength decline while body fat increases. An increase in strength, which correlates to an increase in bone mass and muscle mass, is a benefit of strength training. Strength training may also improve dynamic balance. Osteoporotic fractures in elderly women are often caused by falls that, in turn, may be caused by a lack of balance or muscular strength. Improving balance and muscular strength reduces the

risk of falling and serves as additional protection against fractures.

Once you have built a strong skeleton in the first two decades of life, the next line of defense in the prevention of osteoporosis is preventing bone loss from occurring. A young female who attains a higher peak bone mass may delay the age at which a loss of bone occurs and may decrease the severity of the disease once it develops. Although exercise isn't a substitute for hormone replacement therapy, or other prescription medications used to treat bone loss, it's an important part of a total osteoporosis prevention and treatment program. As part of its "Five Steps to Bone Health," the National Osteoporosis Foundation currently recommends proper nutrition and exercise as well as a bone density test. In addition, the foundation recommends talking with a health care professional to discuss prevention and treatment options. Medication may be deemed necessary to prevent or treat osteoporosis depending on risk factors, medical history, and bone density score. Osteoporosis prevention is a life-long commitment that must include a proper diet, healthy lifestyles and regular check-ups. (For more information on osteoporosis, see Chapter 17, page 165.)

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